WHAT IS CLAIMED IS

1. A synchronous reluctance motor comprising:

a stator having a predetermined number of toothed stator magnetic pole portions wound by armature coils, and

a rotor rotatably supported at an inner peripheral surface of the stator and having a pair of slots formed a radial direction and extending along the inner periphery of the stator with a predetermined interval,

wherein the pair of slots includes an outer side slot formed at an outer periphery side of the rotor and an inner side slot formed at an inner side of the rotor, both the outer side slot and the inner side slot extend toward the outer peripheral surface of the rotor to form a rotor magnetic pole portion, and wherein a width of an effective magnetic path between the outer periphery of the rotor and the outer side slot is defined based on a width of a stator magnetic pole portion multiplied by a predetermined number.

2. The synchronous reluctance motor according to claim 1, wherein the predetermined number is determined to be between 0.7 and 1.3.

3. The synchronous reluctance motor according to claim 1, wherein

a phase number of the synchronous reluctance motor is regarded as m,

a ratio of a number of the stator magnetic pole portions relative to a number of the rotor magnetic pole portions is regarded as n,

a first opening angle is formed by lines connecting a rotational center of the rotor with two cross points formed by the outer periphery of the rotor and a center-line of a magnetic flux path between the outer side slot and the inner side slot,

a second opening angle is formed by another center-lines of the adjacent stator magnetic pole portions in the circumferential directions of the stator, and

wherein the first opening angle is determined based on the second opening angle multiplied by a number (n / 2m) and a second predetermined number.

4. The synchronous reluctance motor according to claim 3, wherein the second predetermined number is determined to be between 4.3 and 4.6.

5. The synchronous reluctance motor according to claim 1, wherein a minimum inter slot distance in the circumferential direction of the rotor is determined based on the stator magnetic pole width multiplied by a third predetermined number.

6. The synchronous reluctance motor according to claim 5, wherein the third predetermined number is determined to be between 1 / 3 and 1.

7. The synchronous reluctance motor according to any one of claims 1 to 6, wherein a permanent magnet is disposed in each of the outer side slot and the inner side slot formed in the rotor.

8. The synchronous reluctance motor according to claim 7, wherein

the permanent magnet disposed in the outer side slot is regarded as an outer side permanent magnet,

the permanent magnet disposed in the inner side slot is regarded as an inner side permanent magnet,

each portion in the inner side permanent magnet and the outer side permanent magnet facing each other in the radial direction is magnetized to be different magnetic pole respectively,

a first total magnetic flux amount of the outer side permanent magnet is determined to be larger than or equal to a second total magnetic flux amount of the inner

side permanent magnet when a center-line of both the outer side slot and the inner side slot in a circumferential direction of the rotor is located in another center-line of the stator magnetic pole portion in the circumferential direction of the stator, and when the armature coils winding around the stator magnetic pole portions are not electrically fed.

9. The synchronous reluctance motor according to claim 8, wherein the first total magnetic flux amount and the second total magnetic flux amount are determined by changing shapes and sizes of the outer side permanent magnets and the inner side permanent magnets depending on locations thereof in the radial direction of the rotor.

10. The synchronous reluctance motor according to claim 8, wherein the outer side permanent magnets and the inner side permanent magnets are constructed of more than one unit permanent magnets uniformly formed in size and shape, the first total magnetic flux amount and second total magnetic flux amount are determined by changing the number of unit permanent magnets disposed in the outer side slot and the inner side slot.

11. The synchronous reluctance motor according to claim 8, wherein each of the outer side slot and the inner side slot has a space defined between the permanent magnets disposed in the slots and an inner peripheral surface of the slots in the radial direction of the rotor, the space is filled with non-magnetic materials, the first total magnetic flux amount and second total magnetic flux amount are determined by changing sizes of the space in the radial direction of the rotor.

12. A synchronous reluctance motor comprising:

a stator having a predetermined number of toothed stator magnetic pole portions wound by armature coils, and

a rotor rotatably supported at an inner peripheral surface of the stator side and having a plurality of slots for a rotor magnetic pole portion formed to be arranged in a radial direction of the rotor and extending along the inner periphery of the stator with a predetermined interval and extending toward the outer periphery of the rotor,

wherein an outer side permanent magnet and an inner side permanent magnet are disposed in the plurality of slots, each portion in the inner side permanent magnet and the outer side permanent magnet facing each other in the radial direction is magnetized to be different magnetic pole respectively, a first total magnetic flux amount of the outer side permanent magnet is determined to be larger than or equal to a second total magnetic flux amount of the inner side permanent magnet when a center-line of both the outer side slot and the inner side slot in a circumferential direction of the rotor is located in another center-line of the stator magnetic pole portion in the circumferential direction of the stator, and when the armature coils winding around the stator magnetic pole portions are not electrically fed.

13. The synchronous reluctance motor according to claim 12, wherein the first total magnetic flux amount and the second total magnetic flux amount are determined by changing shapes and sizes of the outer side permanent magnets and the inner side permanent magnets depending on locations thereof in the radial direction of the rotor.

14. The synchronous reluctance motor according to claim 12, wherein the outer side permanent magnets and the inner side permanent magnets are constructed of more than one unit permanent magnets uniformly formed in size and shape, the first

total magnetic flux amount and second total magnetic flux amount are determined by changing the number of unit permanent magnets disposed in the outer side slot and the inner side slot.

15. The synchronous reluctance motor according to claim 12, wherein each of the outer side slot and the inner side slot has a space defined between the permanent magnets disposed in the slots and an inner peripheral surface of the slots in the radial direction of the rotor, the space is filled with non-magnetic materials, the first total magnetic flux amount and second total magnetic flux amount are determined by changing sizes of the space in the radial direction of the rotor.